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Forest Insect and Disease Management

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BIOLOGICAL
EVALUATION R2-77-7

MOUNTAIN PINE BEETLE

Salida and San Carlos
Ranger Districts
Pike and San Isabel
National Forests

Colorado

JUNE 1977



Rocky Mountain Region

U.S. Department of Agriculture Forest Service

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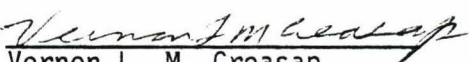
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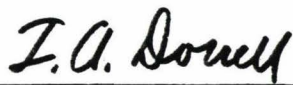
JUNE 1977

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INTRODUCTION

The mountain pine beetle, *Dendroctonus ponderosae* Hopkins, continues to cause ponderosa pine, *Pinus ponderosa* Laws, mortality on the Salida and San Carlos Ranger Districts of the Pike and San Isabel National Forests.

On June 16 and 17, 1977, Donn Cahill, Supervisory Entomologist, and James Allen, Biological Technician, visited the San Carlos Ranger District to investigate a reported infestation of mountain pine beetle on National Forest land which was threatening some ponderosa pine on private land. Observation of apparently high broods indicated that further investigation was necessary. On June 27 - 30, 1977, Vernon Creasap, Entomologist, conducted brood surveys of five areas on the Salida and San Carlos Ranger Districts, using Knight's (1960) sequential sampling plan. ^{1/} All five areas sampled indicated an increasing population.

TECHNICAL INFORMATION

CAUSAL AGENT: *Dendroctonus ponderosae* Hopkins, mountain pine beetle.

HOSTS: *Pinus ponderosa* Laws, ponderosa pine
Pinus contorta Douglas, lodgepole pine

LIFE HISTORY: The mountain pine beetle has one generation per year. Adults attack trees from mid-July through early September by boring through the bark to the cambium. The females then tunnel upward for 12 inches to 30 inches (these tunnels are called egg galleries). The females lay eggs in individual niches along each side of the gallery which is then packed with frass. After hatching, the larvae feed in individual channels (larval galleries) at right angles to the egg galleries in the phloem. The insect

1/

KNIGHT, F. B. 1960. Sequential sampling of Black Hills beetle populations. USDA, For. Serv., Rocky Mtn. For. and Range Exp. Sta. Res. Note #48. 8 p.

overwinters in the larval stage. In the spring, when the larvae are fully developed, they excavate an oval chamber at the end of the larval gallery (pupal chamber) and pupate. Finally, mature adults emerge from the pupal chamber by boring through the outer bark and fly to attack new trees, completing the generation.

METHODS

In accordance with Knight's (1960) sequential sampling plan, two 6-by-6-inch bark samples were removed from dbh on opposite sides of infested ponderosa pine trees. For each sample, the total number of brood, inches of egg gallery and number of each species of parasites and predators was tabulated. In addition, basal area, elevation and degree of woodpeckering was noted. The trend of the beetle population at each sample area was categorized as decreasing, static or increasing.

RESULTS AND DISCUSSION

Two areas on the Salida and three areas on the San Carlos Ranger Districts were surveyed using Knight's (1960) sequential sampling plan. All five areas indicated increasing population trends. Parasites, predators, woodpeckers and other natural factors do not seem to be effectively controlling the mountain pine beetle.

The population trend in this portion of the Colorado Front Range falls into the ^{2/}general pattern of the population trend for the Front Range. ^{2/} Potential build-up of mountain pine beetle populations increases towards the southern portion of the Front Range.

Large acreages of overstocked stands on poor sites provides great potential for mountain pine beetle build-up in ponderosa pine (some mortality of lodgepole pine mixed with ponderosa pine was observed). Large groups (50 or more trees) were observed on private

^{2/}

CREASAP, V. L. M. 1977. R2-77-4. Mountain pine beetle, Colorado Front Range. USDA, For. Serv. Bio. Evaluation. (in process)

and National Forest lands on the San Carlos Ranger District and smaller groups (5 to 50) were observed on the Salida Ranger District.

The mountain pine beetle can be expected to cause significantly greater ponderosa pine mortality in 1977 than in 1976.

RECOMMENDATIONS

The long term recommendation for prevention of mountain pine beetle epidemics in ponderosa pine is to reduce growing stock levels to 80 or below. Emphasis should be placed on removal of dwarf mistletoe infected, diseased or damaged trees, which may be more susceptible to beetle attack. Salvage cutting, in conjunction with growing stock level reduction, will utilize beetle killed timber and remove some brood material from the infestations.

Landowners can use "Pine Tree and Ornamental Spray" ^{3/} to help prevent loss of high value trees. Beetle control efforts should emphasize stand management by reducing growing stock levels to 80 or below.

3/

"Pine Tree and Ornamental Spray" and Lindane are the only preventative sprays registered in Colorado for use against the mountain pine beetle. "Pine Tree and Ornamental Spray" is formulated by Balcom Chemical Inc., 240 22nd St., Greeley, Colorado 80631.

PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U. S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.



Use Pesticides Safely
FOLLOW THE LABEL

U.S. DEPARTMENT OF AGRICULTURE

FIGURE 1

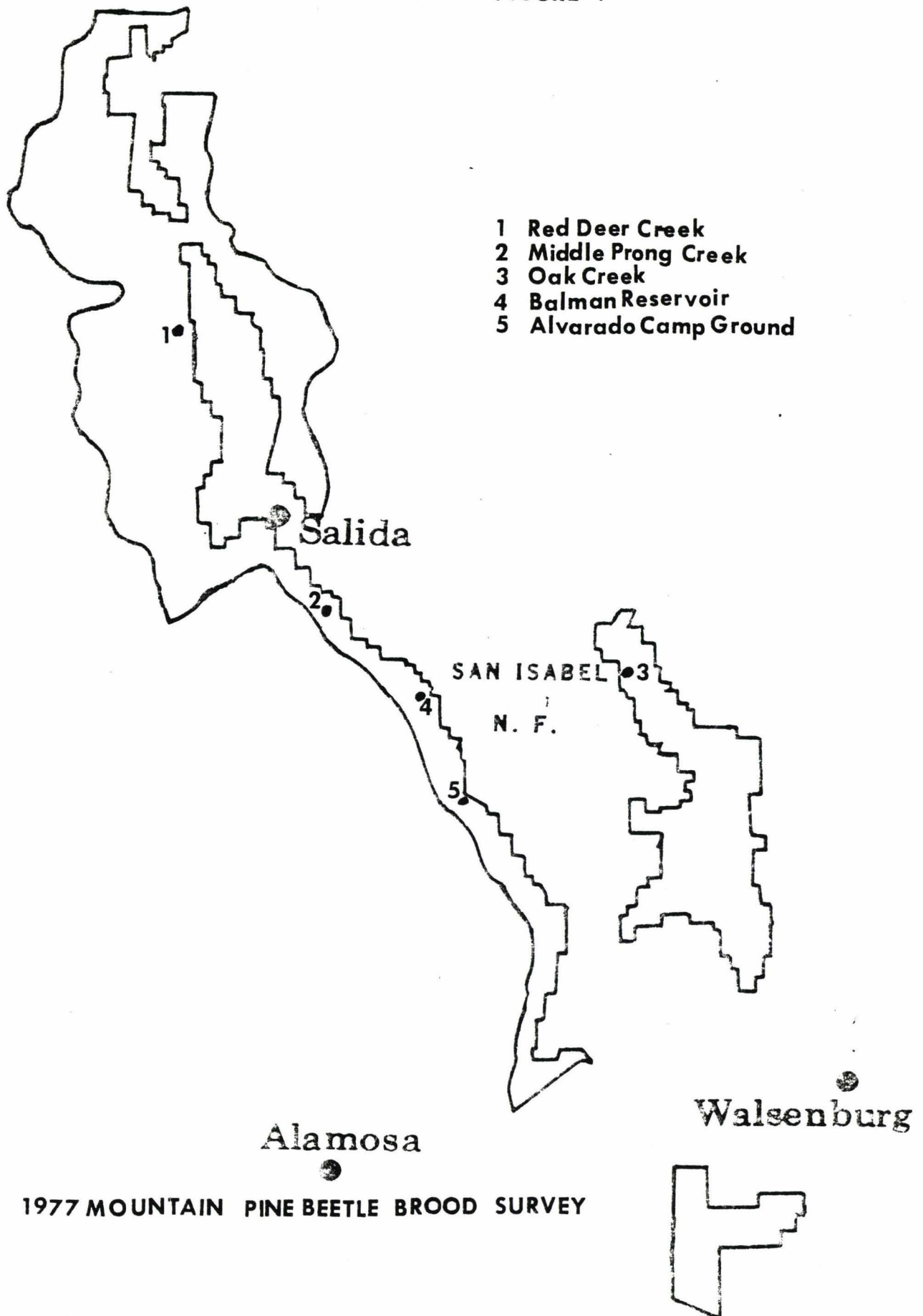


TABLE 1

1977 SAN ISABEL NATIONAL FOREST MPB BROOD SURVEY SUMMARY SHEET

AREA	NUMBER TREES	AVERAGE D.B.H. ± S.E.	NUMBER SAMPLES	TOTAL BROOD	AVERAGE BROOD ± S.E.	TOTAL STARTS	AVERAGE STARTS ± S.E.	TOTAL INCHES OF GALLERY	AVERAGE INCHES OF GALLERY ± S. E.	TOTAL CLERIDS	TOTAL COELOIDES	TOTAL MEDETERA	BASAL AREA	ELEVATION	WOOD- PECKERING	PREDICTED TREND	ESTIMATED BUILD-UP RATIO
SALIDA RANGER DISTRICT																	
RED DEER CREEK	13	9.43 ± .57	26	442	16.23 ± 2.75	52	2.00 ± .19	772	29.69 ± 1.70	1	22	8	70	7,800	MODERATE	INCREASING	1 : 1.6
MIDDLE PRONG CREEK	7	11.81 ± 1.34	14	423	30.21 ± 4.08	26	1.86 ± .23	475	33.93 ± 1.68	3	12	5	100	9,500	LIGHT	INCREASING	1 : 3.0
TOTAL OR AVERAGE	20	10.27 ± .97	40	845	21.13 ± 2.50	78	1.95 ± .15	1,247	31.18 ± 1.28	4	34	13	85	8,650	MODERATE	INCREASING	1 : 2.1
SAN CARLOS RANGER DISTRICT																	
OAK CREEK	10	14.93 ± 1.36	20	754	37.70 ± 4.70	38	1.90 ± .19	431	21.55 ± 1.48	3	2	7	180	7,700	NONE	INCREASING	1 : 3.8
BALMAN RESERVOIR	9	13.12 ± .60	18	462	25.67 ± 2.83	48	2.67 ± .32	561	31.17 ± 2.37	9	15	9	140	9,500	NONE	INCREASING	1 : 2.6
ALVARADO CAMP GROUND	10	10.97 ± .77	20	507	25.35 ± 4.90	33	1.65 ± .24	693	34.65 ± 1.15	0	2	1	150	7,700	MODERATE	INCREASING	1 : 2.5
TOTAL OR AVERAGE	29	13.00 ± .93	58	1,723	29.71 ± 2.57	119	2.05 ± .16	1,685	29.05 ± 1.24	12	19	17	157	8,300	LIGHT	INCREASING	1 : 3.0
GRAND TOTAL OR AVERAGE	49	11.89 ± .71	98	2,568	26.20 ± 1.87	197	2.01 ± .11	2,932	29.92 ± .90	16	53	30	128	8,440	LIGHT	INCREASING	1 : 2.6

TABLE 2
SAN ISABEL MPB

	D.B.H.		BROOD		STARTS		GALLERY	
	Σx	Σx^2	Σx	Σx^2	Σx	Σx^2	Σx	Σx^2
Salida Ranger District								
Red Deer Creek	122.6	1,206.20	422	11,776	52	128	772	24,800
Middle Prong Creek	82.7	1,051.93	423	15,813	26	58	475	16,631
	<u>205.3</u>	<u>2,463.43</u>	<u>845</u>	<u>27,589</u>	<u>78</u>	<u>186</u>	<u>1,247</u>	<u>41,431</u>
Canon City Ranger District								
Oak Creek	149.3	2,395.37	754	36,806	38	86	431	10,121
Balman Reservoir	118.1	1,576.05	462	14,312	48	162	561	19,399
Allvarado Campground	109.7	1,257.01	507	21,985	33	77	693	24,515
	<u>377.1</u>	<u>5,605.53</u>	<u>1,723</u>	<u>73,103</u>	<u>119</u>	<u>325</u>	<u>1,685</u>	<u>54,035</u>
	582.4	8,068.96	2,568	100,692	197	511	2,932	95,466